

WHAT IS CLAIMED IS:

1 A method of post processing an article formed by selective deposition modeling to remove a support structure, the article comprising a three-dimensional object and the support structure, the three-dimensional object formed from a curable phase change composition and the support structure formed from a non-curable phase change composition, the method comprising the following steps:

- (a) providing a temperature controllable environment for the article having an initial temperature above the melting point of the non-curable phase change composition;
- (b) placing the article in the temperature controllable environment;
- (c) holding the temperature of the controllable environment above the melting point of the non-curable phase change composition until substantially all of the support structure transitions to a flowable state and is removed from the three-dimensional object;
- (d) lowering the temperature of the controllable environment to a temperature just above the freezing point of the curable phase change composition;
- (e) holding the temperature of the controllable environment just above the freezing point of the curable phase change composition until the temperature of all the regions of the three-dimensional object substantially equalize; and
- (f) lowering the temperature of the three-dimensional object below the freezing point of the curable phase change composition at a rate wherein a temperature differential within the regions of the three-dimensional object does not exceed about 5°C.

2. The method of claim 1 wherein the temperature controllable environment includes at least one heat transferring medium.

3. The method of claim 2 wherein the heat transferring medium is air.
4. The method of claim 2 wherein the heat transferring medium is a solid.
5. The method of claim 4 wherein the solid heat transferring medium comprises a plurality of particulate matter.
6. The method of claim 2 wherein the heat transferring medium is a liquid.
7. The method of claim 6 wherein the liquid is an organic oil, a mineral oil, water, or the non-curable phase change composition in a flowable state.
8. The method of claim 2 wherein steps (a) (b) and (c) are completed in a heat transferring medium of air, and the steps (d) (e) and (f) are completed in a liquid heat transferring medium.
9. The method of claim 1 wherein the initial temperature of the controllable environment is between about 90° C to about 150° C.
10. The method of claim 1 wherein the initial temperature of the controllable environment is between about 120° C to about 125° C.
11. The method of claim 1 wherein the step of holding the temperature of the controllable environment above the melting point is accomplished for a time period of at least about 20 minutes.

13. The method of claim 1 wherein the step of holding the temperature of the controllable environment just above the freezing point is accomplished for a time period of at least about 20 minutes.

14. The method of claim 1 wherein the step of lowering the temperature of the three-dimensional object below the freezing point is accomplished through a temperature range of between about 75° C to about 40° C.

15. The method of claim 1 wherein the step of lowering the temperature of the three-dimensional object below the freezing point is accomplished through a temperature range of between about 62° C to about 52° C for a period of time between about 5 minutes to about 10 minutes.

16. A method of post processing an article formed by selective deposition modeling, the article comprising a three-dimensional object and a support structure, the three-dimensional object formed from a curable phase change composition and the support structure formed from a non-curable phase change composition, the method comprising the following steps:

- (a) providing a temperature controllable environment for the article having an initial temperature above the melting point of the non-curable phase change composition;
- (b) placing the article in the temperature controllable environment;
- (c) holding the temperature of the controllable environment above the melting point of the non-curable phase change composition until substantially all of the support structure transitions to a flowable state and is removed from the three-dimensional object;
- (d) lowering the temperature of the controllable environment to a temperature just above the freezing point of the curable phase change composition;
- (e) holding the temperature of the controllable environment just above the freezing point of the curable phase change composition until the temperature of all the regions of the three-dimensional object substantially equalize; and
- (f) lowering the temperature of the three-dimensional object below the freezing point of the curable phase change composition at a rate wherein the temperature of the regions of the three-dimensional object remain substantially equal as the freezing point is crossed.

17. The method of claim 16 wherein the temperature controllable environment includes at least one heat transferring medium.

18. The method of claim 17 wherein the heat transferring medium is air.

19. The method of claim 17 wherein the heat transferring medium is a solid.
20. The method of claim 19 wherein the solid heat transferring medium comprises a plurality of particulate matter.
21. The method of claim 17 wherein the heat transferring medium is a liquid.
22. The method of claim 17 wherein the liquid is an organic oil, a mineral oil, water, or the non-curable phase change composition in a flowable state.
23. The method of claim 16 wherein steps (a) (b) and (c) are completed in a heat transferring medium of air, and the steps (d) (e) and (f) are completed in a liquid, heat transferring medium.
24. The method of claim 16 wherein the initial temperature of the controllable environment is between about 90° C to about 150° C.
25. The method of claim 16 wherein the initial temperature of the controllable environment is between about 120° C to about 125° C.
26. The method of claim 16 wherein the step of holding the temperature of the controllable environment above the melting point is accomplished for a time period of at least about 20 minutes.
27. The method of claim 16 wherein the step of lowering the temperature of the controllable environment to just above the freezing point is between about 75° C to about 65° C.

28. The method of claim 16 wherein the step of holding the temperature of the controllable environment just above the freezing point is accomplished for a time period of at least about 20 minutes.

29. The method of claim 16 wherein the step of lowering the temperature of the three-dimensional object below the freezing point is accomplished through a temperature range of between about 75° C to about 40° C.

30. The method of claim 16 wherein the step of lowering the temperature of the three-dimensional object below the freezing point is accomplished through a temperature range of between about 62° C to about 52° C for a period of time between about 5 minutes to about 10 minutes.

0970737-5034
10004-22250

31. A method of post processing an article formed by selective deposition modeling to remove a support structure, the article comprising a three-dimensional object and the support structure, the three-dimensional object formed from a curable phase change composition and the support structure formed from a non-curable phase change composition, the method comprising the following steps:

- (a) providing a temperature controllable environment for the article having an initial temperature above the melting point of the non-curable phase change composition;
- (b) placing the article in the temperature controllable environment;
- (c) removing substantially all of the support structure in a flowable state from the article;
- (d) lowering the temperature of the controllable environment to a temperature just above the freezing point of the curable phase change composition and allowing the temperature of all the regions of the three-dimensional object to substantially equalize;
- (e) lowering the temperature of the three-dimensional object below the freezing point of the curable phase change composition at a rate wherein a temperature differential within the regions of the three-dimensional object does not exceed about 5°C.

32. The method of claim 31 wherein the temperature controllable environment includes at least one heat transferring medium.

33. The method of claim 32 wherein the heat transferring medium is air.

34. The method of claim 32 wherein the heat transferring medium is a solid.

35. The method of claim 34 wherein the solid heat transferring medium

comprises a plurality of particulate matter.

36. The method of claim 32 wherein the heat transferring medium is a liquid.

37. The method of claim 36 wherein the liquid is an organic oil, a mineral oil, water, or the non-curable phase change composition in a flowable state.

38. The method of claim 32 wherein steps (a) (b) and (c) are completed in a heat transferring medium of air, and the steps (d) and (e) are completed in a liquid heat transferring medium.

39. The method of claim 31 wherein the step of lowering the temperature of the controllable environment to just above the freezing point is between about 75° C to about 65° C.

40. The method of claim 31 wherein the step of lowering the temperature of the three-dimensional object below the freezing point is accomplished through a temperature range of between about 75° C to about 40° C.

41. The method of claim 31 wherein the step of lowering the temperature of the three-dimensional object below the freezing point is accomplished through a temperature range of between about 62° C to about 52° C for a period of time between about 5 minutes to about 10 minutes.

Adel A'